

From: Amy Brownell

Sent: Wednesday, February 4, 2009 2:43 PM

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Subject: Re: February 12 and 13 ETCA meetings

Attachments: Building134_Implications on B_02_03_09 draft to Navy.doc; Parcel B MostLike Quant 02_03_09 Draft to Navy.xls; Parcel G MostLike Quant 02_03-09 Draft to navy.xls; Parcel B Lactate Narrative 02_03_09 Draft to Navy.doc

As Melanie and I discussed - Mactec has been preparing many details to assist us in our discussion of the ETCA scope.

Attached are one table and two narratives concerning Parcel B ETCA scope and one table concerning Parcel G ETCA scope. We will use this information during our morning discussions on Feb 12 and 13 - so if you can familiarize yourselves with the content it will assist us in being able to have in-depth discussions.

We are preparing a draft agenda to organize the discussions. The order of discussion topics will be different than the order listed on the tables (the order on tables was to assist in calculation of quantities)

let me know if you have any questions.

thanks,

Amy Brownell, P.E.

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Brownell/DPH/SFGO

V

To

Catherine Pearson/CTYATT@CTYATT,

02/03/2009 05:23

Celena Chen/REDEV/SFGOV@SFGOV,

PM

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Subject

Re: February 12 and 13 ETCA
meetings(Document link: Amy
Brownell)

I hate to do this to everyone but Navy schedules are such that we're going to have to rally and have a very long and intense day of discussions on the 12th.

Here is the plan

Meetings will be held at Paul Hastings Janofsky Walker offices (Gordon Hart's office) at 55 second street 24th floor

We'll send a proposed agenda later this week with suggestions for particular topics at particular times - as follows

February 12th

8 am to 9 am - Keith, Melanie and whatever other Navy folks can get there that early and Navy technical consultants will meet with the

City/Lennar/Mactec folks and we'll discuss a couple of detailed technical issues of the scope and quantities

approx. 9 am when the remaining Navy team arrives from San Diego - we'll take a step back and talk about some of the Big Picture Issues on the Scope. Continue discussions on Big Picture Issues as long as needed. If there is time - go back to talking technical details until Noon.

Noon to 1 pm Lunch

1 pm - 4pm ETCA language discussions.

Feb 13th

8 am to 11 am - Keith, Melanie and Navy technical consultants meet with City/Lennar/Mactec to discuss remaining technical scope details - if needed.

Amy
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Subject
February 12 and 13 ETCA meetings

Hello everyone:

I just spoke with Melanie and we are confirmed for February 12 and 13 ETCA meetings

The schedule will be:

Morning of February 12 from 9 am to noon - Discussion of ETCA scope - big picture issues and start discussion on details of quantities
Afternoon of February 12 from 1 pm to 4 pm - Discussion of ETCA language
Morning of February 13 from 9 am to noon - More discussion of ETCA scope - continuation of details about quantities (cubic yards, number of reports, years of gw monitoring, number of wells sampled during monitoring)

Lawyers need to attend the afternoon meeting of February 12 but they are welcome to attend all of the meetings (Gordon has already said that he will attend all the meetings)

The meeting will be held in SF.
I will find a room and send that information in subsequent email.

As Melanie and I discussed - Navy and City/Lennar/Mactec will exchange backup info that both parties are working on in relation to scope quantities prior to meeting.

thanks,
amy
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(See attached file: Building134_Implications on B_02_03_09 draft to Navy.doc)(See attached file: Parcel B MostLike Quant 02_03_09 Draft to Navy.xls)(See attached file: Parcel G MostLike Quant 02_03-09 Draft to navy.xls)(See attached file: Parcel B Lactate Narrative 02_03_09 Draft to Navy.doc)

Draft Document – 02/03/2009
Former Hunters Point Shipyard
Parcel B Guaranteed Fixed Price Remediation (GFPR)
Scoping Document Prepared by MACTEC

Implications for Building 134 Remediation (in Parcel C) to Affect Parcel B Risks and Development Schedules

Groundwater risk plumes identified for Parcel B include the IR-25 (Building 134) VOC plume, including potential for DNAPL. Based on more recent data (2007-08), the IR-25 groundwater plume, with an identified source area in Parcel C within Building 134, appears to have stabilized short of the Parcel B/C boundary. Bioremediation is proposed (Navy Proposed Plan for Parcel C) as one remedial measure for the IR-25 VOC plume. However, initial phases of bioremediation often result in increases in VOC concentrations from desorbing compounds. Before bacteria become acclimated to begin the process of anaerobic degradation of parent chlorinated compounds, more mobile released plume constituents may migrate beyond current extents. Further, unless the process is well-controlled, vinyl chloride may form from chlorinated ethenes (with a lower water quality criterion and risk target concentration than the parent compound(s)) and part of the process may stall at this step. The suspected presence of DNAPL at Building 134 raises concerns for a difficult and prolonged remediation (already estimated in the Parcel C Feasibility Study as possibly 15 years or more).

Established limits of the groundwater plumes also do not necessarily determine limits of associated soil vapor extent (both soil and groundwater sources) nor of migration potentials. The proximity of proposed development on Parcel B to known contaminants in IR-25 (in soil, soil vapor and groundwater) raises concerns for potential impacts in the IR-10/Building 123 area for indoor air and/or construction worker risk scenarios due to the IR-25 contaminated media.

Two Approaches to Mitigate Impacts to Parcel B

Two approaches suggest themselves to mitigate potential impacts to Parcel B from Building 134 that would affect potential human health risks and development schedules. The first is to create barriers to migration from Building 134 onto Parcel B. The second is to coordinate the Building 134 remediation with Parcel B activities.

Barriers to Mitigate Migration from IR-25 (Building 134) – not the preferred alternative

Mitigation of migration from IR-25 onto Parcel B could be achieved by a variety of remedial measures. Groundwater migration and some vapor migration could be restricted with an impermeable barrier wall. Some groundwater extraction and treatment behind the wall may be necessary to prevent mounding, but flow rates would be expected to be small. A permeable reactive barrier is another possibility, but the selection of the right mix of reactive materials may be subject to treatability testing as the COCs contain chlorinated benzenes as well as chlorinated ethenes and ethanes. Soil vapor migration may need to be constrained in the unsaturated zone, and a venting or SVE system may be used to establish a barrier to such migration from Building 134 onto Parcel B. Soil vapors may be sorbed and collected for disposal, or other means may be used to destroy the collected vapors.

MACTEC to Implement the Coordinated Simultaneous Remediation of Buildings 123 and 134 – the preferred alternative

The more logical alternative to the second approach is for MACTEC to assume the design and implementation of the remedy for Building 134 (and possibly the remainder of RU-C5, i.e., to include IR-06, the former fuel tank farm).

Similarities in remedial approaches for soil and groundwater in IR-10 and IR-25 raise the possibility of economies such as mobilization and monitoring for combining IR-10 and IR-25 remedial measures. The proximity of IR-25 and IR-06 (combined as RU-C5) suggests even further potential economies of scale, schedule and continuity, i.e., it makes sense to coordinate items such as excavation, HRC/ORC injection, and SVE application within RU-C5 with IR-10 activities. It may be possible to further reduce costs and achieve an accelerated schedule through a modified approach to save on remedial and long-term monitoring costs, while minimizing schedule conflicts and lessening risks.

Proposed development within Parcel B/IR-10 area may be affected by the schedule of remediation applied to the IR-06 and IR-25 groundwater and soil remediation. The transfer of the responsibility for the remediation of IR-25 or RU-C5 from the Navy to City/Lennar/MACTEC could be achieved administratively through a Guaranteed Fixed Price Remediation contract.

**Hunters Point Shipyard
Parcel B Scope of Work
Proposed Guaranteed Fixed Price Remediation
Prepared By MACTEC
"Most Likely" Quantity Estimate
Draft
2/3/2009**

WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
1.0	Project, Planning and Scheduling:			
1.1	Scheduling and Progress Reporting: Developing and maintaining a master project schedule and monthly progress reports.	Schedule updates Reports	ea ea	160 160
1.2	Database Development and Maintenance: Development of a chemistry database to store all analytical data	SQL Database setup SQL Database maintenance	ea ea	1 1
1.3	Administrative Record Support	Periodic deliverable requests	ea	1
2.0	Soil Gas Survey			
	To be performed in the future parcel-wide and at discrete suspect areas for VOC soil gas analyses. Survey excludes IR-07/18 and any work outside Parcel B boundary. It is assumed that the Navy will have remedies in place to address any source of soil gas within 100 feet outside of Parcel B boundary prior to parcel transfer.			
2.1	Work Plan Preparation: Includes SAP, QAPP, & HSP	Work Plan	ea	1
2.2	Soil Gas Survey Implementation: To be conducted parcel-wide (41 acres) using a 100 ft x 100 ft grid system at areas that can not be negotiated to be clean with the regulatory agencies based on past-use / sampling experience. This equates to approximately 4.4 survey point locations per acre. Also to be performed at finer grid (50 ft x 50 ft) or select-location sampling at suspect areas where former VOC soil or soil gas sampling has shown exceedances of ESLs. Where exceedances occur, follow-up sampling will take place to define the extent during a 2nd mobilization.	Geoprobe Mob/Demob Sampling Survey Points Cores thru concrete floor slabs TO-15 analyses for volatiles (number of samples) Geotechnical samples	ea ea ea ea ea	2 395 47 494 45
2.3	Soil Gas Survey Report: Includes data validation and reporting of soil gas survey results with figures and tables.	Report	ea	1
2.4	Development of Soil Gas Cleanup Levels Memorandum Assumes that the Navy will develop a risk methodology approach that is approved by the regulators and performed by City/Lennar/MACTEC. Memorandum will include what mitigation measures will be performed.	Memorandum	ea	1
3.0	Remedial Design			
	Includes remedial designs for the following components: Soil vapor extraction system expansion & operation at Bldg 123; In-situ injection with lactate and organo-sulfur at IR-10; Revetment construction at BOS-3; Hot spot soil excavations and soil covers; and			

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
	Long-term Groundwater Monitoring			

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3.1	<p>Pre-Design Field Work</p> <p>SVE Well Location Design for Bldg 123: SVE well installation will require up to 10 pre-design drive points to sample soil / soil gas for locating new extraction and vapor monitoring wells required per ROD in Bldg 123. Soil gas samples would also be collected from existing extraction & monitoring points to establish baseline conditions to base regulatory metrics.</p> <p>Lactate Injection Design for IR-10A Plume: Injection dosage and monitoring will require site-specific geochemical data, including nitrate, manganese, iron and sulfate. Collection will be from 6 existing wells. Use of existing groundwater VOC data is sufficient.</p> <p>Organo-Sulfur Injection Design for IR-10B Plume: Cr+6 is believed to be the only metal exceedance that may potentially result in a long-term groundwater monitoring issue and/or require treatment per the regulatory agencies. Pre-design work would entail advancing up to 10 geoprobe points to locate where to best inject. Analyses would be by field colorimetric methods with detection limit of 10 ug/L with off-site confirmation of two highest samples.</p> <p>Revetment Design / Soil Cover Design:</p> <p>Long-Term Groundwater Monitoring Work:</p>	<p>Pre-Design Field Activities</p> <ul style="list-style-type: none"> - geoprobe mob/demob - cores through floor slab - drive points - soil samples - soil gas samples - baseline soil gas samples <p>- collect/analyze groundwater samples</p> <ul style="list-style-type: none"> - geoprobe mob/demob - drive points - HACH test kit - Off-site lab Cr+6 samples <p>-Topographic Survey</p> <p>- Hydrographic Survey</p> <p>- Geotechnical Evaluation</p> <p>- monitoring well verification</p> <p>field reconnaissance</p>	<p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p>	<p>1</p> <p>10</p> <p>10</p> <p>10</p> <p>10</p> <p>59</p> <p>6</p> <p>1</p> <p>10</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
3.2	<p>Remedial Design Documents</p> <p>Includes design for all the remedial elements including engineering controls such as liquid-boot with passive vapor controls.</p> <p>Institutional Controls (ICs)</p>	<p>Remedial Design (includes basis of design, specifications, and drawings.)</p> <p>LUCs</p> <p>CRUPs</p> <p>Deed Restrictions</p> <p>RMPs</p>	<p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p> <p>ea</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
4.0	<p>Remedial Action Work Plan (RAWP)</p> <p>RAWP includes plans for the following components: Soil vapor extraction expansion & operation at Bldg 123; In-situ injection with lactate and organo-sulfur at IR-10; Revetment construction at BOS-3; Hot spot soil excavations and soil covers; liquid-boot with passive vapor controls; and Long-term Groundwater Monitoring Plan.</p>	<p>RAWP (includes SAP, QAPP and HSP)</p>	<p>ea</p>	<p>1</p>

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
5.0	Remedial Implementation			
5.1	Soil Excavation			
	•Site Preparation	Mob/Demob	ea	1
		Permit applications	ea	1
	•Survey Control			
	•Hot Spot Excavation	Excavation	cy	249
	3 areas B3416, B3426, B4716 each 83 cy in volume per the ROD			
5.2	Soil Vapor Extraction System Expansion & Operation The SVE system in Bldg 123 is to be expanded and operated per the ROD. The existing system covers approximately 11,350 sq. ft. with 10 ft unsaturated zone. The Phase III SVE Treatability Study (TS) recommends additional extraction wells be installed to reduce TCE concentrations at the west end of the building. Duration of operation is not specified or costed in the ROD but the Phase III SVE TS recommends running the system in a pulsed mode. MACTEC concurs, given asymptotic conditions have already been reached for most extraction wells within the system. Running the system efficiently for much longer than one year is not anticipated.			
	•Site Preparation Activities	Install extraction wells (4 in)	ea	4
	Mark proposed well locations, / Dig-Safe coordination;	Install Vapor Mon. well pairs (2 in)	ea	4
	Install new wells for system expansion; Perform GPS survey. Permitting.	GPS survey - update system layout	ea	1
	•Retrofit and Construction			
	Equipment procurement; well head construction; piping connections; emissions stack erection; power hookup	GAC Vessels-1,000 lbs ea	ea	2
		1000 gal poly transfer tank	ea	1
		Blower	ea	0
		Piping (2 to 6 in)	lf	2000
		Electrical connection	ea	1
		meter/circuit breaker panel	ea	0
	•System Shakedown			
	Collect baseline analytical and PID measurements in new well points; establish injection well / extraction well pattern layout.	Collect baseline soil gas samples	ea	22
	•Operations and Maintenance (Including Reporting)			
	System pulsed for 1-yr period; After removal of bulk mass of contaminant within new extraction area (assume 2 mo), commence with pulse operation. Assume 2 wks on and 3 wks off. Gas samples measured by PID each sampling event and off-site analyses every other sampling event. Reporting: Semi-annual (mid-treatment and final report)	RA Soil gas sampling event	event	5
		PID gas measurement event	event	9
		Reports	ea	2

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
	<ul style="list-style-type: none"> System Decommissioning <ul style="list-style-type: none"> Remove and dispose of off-gas carbon absorbers Remove piping / grout & decommission wells Salvage SVE trailer for continued use elsewhere 	SVE/VM well decommissioning GAC disposal Equipment decommissioning	ea lbs ea	73 2000 1
5.3	<p>VOC Groundwater Remediation - In-Situ Injection with Lactate</p> <p>The IR-10A (VOC) plume is to be treated by injection of lactate per the ROD. The ROD suggests a single injection within a localized hot zone will achieve remedial objectives. It is MACTEC's belief that with this approach, remedial objectives will not be achieved without also relying on natural attenuation over an indefinite period of time, if they are ever actually achieved at all. Discrepancy between use of a "slow release" organic substrate as is discussed in the text of the ROD versus the use of a "non-slow release" sodium lactate in the ROD cost tables only adds further uncertainty into the cost and effectiveness of the proposed injection scenario. Furthermore, VC the most recalcitrant of the TCE degradation daughter products appears to be increasing since the ZVI treatability testing. Unless the regulatory agencies concur in writing that MNA, (which is not a stated component of the selected remedy) is acceptable given the above shortcomings, then MACTEC proposes a more aggressive injection scenario.</p> <ul style="list-style-type: none"> Site Preparation Activities <ul style="list-style-type: none"> Mark proposed injection locations, / Dig-Safe coordination; Collect baseline groundwater parameters; survey; Permitting Round 1 Injection <ul style="list-style-type: none"> Perform 1st round of injections; followed by GPS location survey. Approximately 15,200 lbs of sodium lactate (material costed in ROD, but is not "slow-release") is anticipated to be required. Round 1 Process Monitoring <ul style="list-style-type: none"> Collect post injection groundwater samples Prepare Report Round 2, 3, and 4 Injections <ul style="list-style-type: none"> Perform up to 3 additional rounds of injections each followed by GPS survey. It is anticipated that approximately 31,400 lbs of sodium lactate may be required total for the remaining three rounds, injected through successively fewer points, as needed. Round 2, 3, and 4 Process Monitoring <ul style="list-style-type: none"> Collect post injection groundwater samples 	Collect and analyze groundwater samples from existing wells Geoprobe mob/demob Advance drive points Cores thru floor slabs GPS survey - document pts Collect and analyze groundwater samples from existing wells Report Geoprobe mob/demob Drive points (total all 3 rounds) Cores thru floor slabs GPS surveys - document pts Collect and analyze groundwater samples from existing wells	ea ea ea ea ea ea ea ea ea ea ea	14 1 42 23 1 14 1 3 87 17 3 42

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
	Prepare Reports	Report	ea	3

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
5.4	Soil Cover / Liquid Boot Installation •Soil Cover Construction	Cover area	sq ft	1.26M
5.5	Soil Vapor Control Technology	Area Needing Liquid Boot and Passive Venting System	sq ft	331,840
5.6	<p>Metal Groundwater Remediation - In-Situ Injection with Organo-Sulfur: Cr+6, apparently no longer present since the decommissioning of IR10MW 12A, is the only metals exceedance that may potentially result in a long-term groundwater monitoring issue and/or require treatment by the regulatory agencies. Injection would be in the IR-10B plume historically located at the exterior west end of Bldg 123.</p> <p>•Site Preparation Activities Mark proposed injection locations, / dig safe coordination; Collect baseline groundwater parameters; survey; Permitting [Note: 3 new wells to be installed under the Long-Term Monitoring Program for this remediation.</p> <p>•Round 1 Injection Perform 1st round of injections; followed by GPS location survey. Approximately 1,100 lbs of organo-sulfur compound (MRC®) with 810 lbs of primer (HRC®) is anticipated to be required.</p> <p>•Round 1 Process Monitoring Collect post injection groundwater samples Prepare report</p> <p>•Round 2 Injection Perform 2nd injection round followed by GPS survey Approximately 580 lbs of organo-sulfur compound (MRC®) with 450 lbs of primer (HRC®) is estimated for the second injection.</p> <p>•Round 2 Process Monitoring Collect post injection groundwater samples Prepare report</p>	<p>Collect and analyze groundwater samples from new & existing wells</p> <p>Geoprobe mob/demob Advance drive points Cores thru floor slabs GPS survey - document pts</p> <p>Collect and analyze groundwater samples from new & existing wells Report</p> <p>Geoprobe mob/demob Drive points Cores thru floor slabs GPS surveys - document pts</p> <p>Collect and analyze groundwater samples from new & existing wells Report</p>	<p>ea</p> <p>ea ea ea ea</p> <p>ea ea</p> <p>ea ea ea ea</p> <p>ea ea</p>	<p>10</p> <p>1 15 2 1</p> <p>10 1</p> <p>1 8 0 1</p> <p>10 1</p>

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
5.7	<p>Long-Term Groundwater Monitoring</p> <p>•Field Work</p> <p>a) <u>Year 1</u> - Quarterly Sampling and <u>Years 2-4</u> Semi-Annual Monitoring</p> <p>Collect and analyze samples from 70 wells in Years 1-2, and 73 wells in Years 3-4 and measure water levels in 14 additional wells in Years 1-4. Assumes that the current gw monitoring program will continue (38 wells) with the addition of samples collected under the SAP supplemental program (2 wells), TPH monitoring program (16 wells), and expanded monitoring for radiological parameters per the ROD (14 additional wells). For Year 1, in accordance with the current monitoring program, 67 wells will be sampled quarterly with 3 wells monitored on a semiannual basis. It is assumed that for Years 2-4, wells that were sampled on a quarterly basis in Year 1 will move to semi-annual sampling and wells that were sampled on a semi-annual basis in Year 1 will move to annual sampling and that wells monitored for radiological parameters will move to annual sampling per the ROD. In addition, in Years 3 and 4, three wells installed for remedy monitoring will be added and sampled on a semi-annual basis. The sampling frequency will be as specified in the ROD, quarterly for Year 1 and semi-annual for Years 2-4.</p> <p>b) <u>Years 5-14</u> and 16-30 Annual Sampling and <u>Year 15</u> Quarterly Sampling</p> <p>By year 5, it is assumed that the TPH monitoring program will cease and that the analytical program will be reduced to that anticipated by the TMSRA to include sampling 28 wells for VOCs, 7 wells for mercury, 2 wells for metals, and 4 wells for hexavalent chromium, plus 3 new wells for remedy monitoring not in the TMSRA (31 wells). It is also assumed that 14 additional wells will be monitored for radiological parameters per the TMSRA (45 wells total). It is assumed that the 3 remedy monitoring wells will be sampled until Year 15 reducing the wells sampled to 42 in Year 15. In accordance with the ROD, samples will be analyzed annually in years 5-14 and 16-30 and in year 15, the wells will be sampled on a quarterly basis.</p>	<p>Water level monitoring and sampling and analysis of groundwater samples from monitoring wells</p> <p>Water level monitoring and sampling and analysis of groundwater samples from monitoring wells</p>	<p>events</p> <p>events</p>	<p>10</p> <p>29</p>
	<p>•Reporting - Data Management/Evaluation/Validation</p> <p>a) Data Validation</p> <p>For each sampling event, validate chemical analytical data and generate a Quality Control Summary Report. Level III validation will be performed on 80% of the samples and Level IV validation will be performed on 20% of the samples</p> <p>b) Data Management</p> <p>For each sampling event, the water level and chemical analytical data and data validation qualifiers will be loaded into a SQL database</p> <p>c) Data Evaluation</p> <p>For each sampling event, the groundwater elevation and chemical analytical data will be compiled in tables and figures, evaluated and interpreted for presentation in applicable quarterly, semi-annual, and annual reports</p>	<p>Validate chemical analytical data and generate data validation summary report.</p> <p>Load data from groundwater monitoring program</p> <p>Compile and evaluate data from groundwater monitoring program</p>	<p>events</p> <p>events</p> <p>events</p>	<p>39</p> <p>39</p> <p>39</p>

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
	d) Groundwater Monitoring Reporting Prepare a report presenting and interpreting data collected for each quarterly, semi-annual, or annual event. Draft, Draft Final, and Final versions of each report will be generated.	Prepare groundwater monitoring report	ea	39
5.8	Monitoring Well Installation/Well Abandonment Includes 3 wells that are planned to be installed to monitor the effectiveness of the remedy at IR10B. It also includes up to 7 wells that are assumed to be installed to replace wells that are damaged during the life of the groundwater monitoring program. •Site Preparation •Monitoring Well Installation and Development •Well Abandonment Wells that are not part of the groundwater monitoring program will be abandoned. Abandon all existing wells at end of groundwater monitoring program •Well Rehabilitation Re-habilitate wells as necessary anticipating that some may have filled with sediment or other obstructions. •Well Extensions The potential requirement for well extensions will be assessed based upon the area of 2 foot cover.	Permitting, borehole clearance, and concrete coring Install and develop well Abandon wells Abandon wells Redevelop wells as needed Add extensions to top of wells in areas determined as requiring soil cover.	wells wells well well events well	10 10 31 85 30 TBD
5.9	5-Year Reviews (2013 to 2043) •Preparation of Draft Five-Year Reviews •Response to Comments of Five-Year Reviews •Finalization of Five-Year Reviews	Reports	ea	7
5.10	TPH Program Completion •Corrective Action Implementation Work Plan •Corrective Action Implementation CAA-21, CAA-22, AOC 46-A, and AOC 46-B AOC 24-E Soil Borings Monitoring Well Installation (temporary), Development and Monitoring	Detail implementation per CAP Limited groundwater monitoring, ICs Boring installation Install and develop and sample wells Limited groundwater monitoring, ICs Excavation Unknown Pipeline Removal	ea ea ea wells ea cy ea	1 1 3 2 1 750 1

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
	AOC 26-C Soil Borings Monitoring Well Installation (temporary), Development and Monitoring	Boring installation Install and develop and sample wells Limited groundwater monitoring, ICs Excavation Unknown Pipeline Removal	ea wells ea cy ea	3 2 1 750 1
5.11	Shoreline Revetment •Site Preparation Activities •Riprap Construction - Overall length: 1,400 linear feet - 330-lb stone will be used to build the revetment. •Integration with Soil Cover -To be done concurrently with revetment construction. •Operations and Maintenance - O & M for the revetment consists of annual walk-over inspections. The structure will also be surveyed both above and below water at 10-year intervals. (Total 3 topographic and hydrographic surveys.) Revetment repairs are budgeted for three times over the 30-year period (750 cy of riprap)	Permit applications Cut Fill Riprap Concrete Monitoring effort for 30 years	ea cy cy cy cy ea ea	1 9,000 200 8,350 6,500 1 1
5.12	Implementation of Institutional Controls	Enforce Deed Restrictions Annual Inspections Risk Management Oversight Cover O&M at IR-07/18	ea ea ea ea	1 1 1 1
6.0	Final Remedial Action Completion Report (RACR) •Final Remedial Action and Site Closure documentation	Report	ea	1
7.0	Public Involvement •Development of a Community Coordination Plan, •Fact Sheets, and attendance of Citizen Advisory •Committee (CAC) meetings	Community Coordination Plan Fact Sheets CAC Meetings	ea ea ea	1 45 160
8.0	Regulatory Oversight	Estimated cost to be provided by the regulatory agencies.	TBD	TBD
9.0	Insurance	Includes Cost Cap & PLL Insurance	TBD	TBD
10.0	City/Lennar Administrative Support			

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
		3rd Party overseer for SFDPH/SFRA during the implementation of ETCA	TBD	TBD

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WBS Task /Subtask	Description	Scoping Item	Unit	Quantity
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Notes:

- (1) Deliverable involves preparation of an internal draft, draft, draft final and final submission.
- (2) Groundwater parameters include alkalinity, TOC, nitrate, nitrite, sulfate, iron, manganese, VOCs; sample quantity includes QA/QC samples
- (3) Groundwater parameters include Cr+6, alkalinity, TOC, nitrate, nitrite, sulfate, iron, manganese; Sample quantity includes QA/QC samples.
- (4) A specific HSP will be required for cover O&M and groundwater monitoring at IR-07/08.
- (5) This Most-Likely Scope of Work assumes Parcel B has no impact from the Building 134 area.

AOC = Areas of Concern

CAA = Corrective Action Areas

CAC = Citizen Advisory Committee

CAP = Corrective Action Plan

CRUP = Covenant to Restrict Use of Property

cy = Cubic Yards

DVE = Dual-Phase Vacuum Extraction

ea = Each

ESLs = Environmental Screening Levels

GAC = Granular Activated Carbon

gw = groundwater

HSP = Health & Safety Plan

IC = Institutional Controls

LUCs = Land Use Controls

MNA = Monitored Natural Attenuation

O&M = Operation and Maintenance

PID = Photoionization Detector

QAPP = Quality Assurance Project Plan

RA = Remedial Action

RACR = Remedial Action Completion Report

RAWP = Remedial Action Work Plan

RMP = Risk Management Procedures

ROD = Record of Decision

SAP = Sampling & Analysis Plan

SQL = Structured Query Language

SVE = Soil Vapor Extraction

TBD = To be determined

TCE = Trichloroethylene

TMSRA = Technical Memorandum in Support of a Record of Decision Amendment

TPH = Total Petroleum Hydrocarbons

VM = Vapor Monitoring

VOC = Volatile Organic Compound

WBS = Work Breakdown Structure

ZVI = Zero Valent Iron

Notes
Monthly for the 1st 5 yrs; quarterly thereafter. Monthly for the 1st 5 yrs; quarterly thereafter.
Maintain SQL database for 30 yrs.
Respond to requests to provide additional documents to the Navy and/or their contractors.
(1)
Parcel-wide grid (181 survey points); finer grid suspect areas (54 survey points); and follow-up at exceedance locations (160 survey points assuming 20 exceedance locations w / 8 additional points at these exceedance locations) 15 cores within Bldg 123 floor over plume area; 16 cores in former ESL exceedance areas (purple map areas); and 16 follow-up survey point location cores. Some vapor sampling assumed to be at two depths to support risk assessment; Quantity also includes 10% duplicates Geotech information pertinent for risk assessment such as soil type, porosity, moisture content, total organic content, and grain-size distribution; collected at 10% of soil gas sampling locations.
(1)
(1)
It is assumed that the following components have been or will be completed by the Navy upon parcel transfer: <ul style="list-style-type: none"> •Completion of all radiological sampling and remediation including storm drains / sanitary sewer excavation and backfill. •Completion of all excavation work and groundwater issues pertaining to mercury

Notes
contamination at IR-26. •Remedial work at IR-07/18

Notes
VOC analysis Includes 10% duplicates.
Confirmation samples
(1)
Includes Pre-Development and Active Redevelopment RMPs
(1)

Notes
In-place volume specified in the ROD; Assumes no verification sampling is needed.
The work entails operating and maintaining the existing and proposed expanded portion of the SVE system.
Expected to reuse the existing trailer system
Expected to reuse the existing meter and circuit breaker panel.
From new SVE & VM wells & 10% dup; existing wells sampled under predesign
83 samples per event (new / existing SVE / VM wells & off-gas plus 10% dup)
83 samples per event
(1)

Notes
(2)
25-foot x 30-foot spaced injection points within plume depicted in the TMSRA/ROD Assumed not to readily coincide with cores for SVE or soil gas survey.
(2)
(1)
As plume shrinks, successively fewer points are anticipated each injection round Reinjections are likely to be required between initial points / rows of injections.
(2); Total of all three rounds

Notes
(1)

Notes
<p>Area is based on 2008 proposed development excluding IR-07/18 area. The cover will consist of either 2 feet of soil or hard-scape repairs based on a proposed walk-through of the site to assess current conditions. Excludes building pads</p>
<p>Includes building areas that overlay the VOC plume entirely/partially or VOCs in soils exceeding residential ESLs (purple map areas). Excludes areas within the risk 100-foot buffer zone. Includes 10% contingencies for building foundations and utilities. Includes building footprint areas that cross into Parcel C.</p>
<p>The ROD identifies chromium, mercury, lead, and copper as metals in groundwater that require treatment, if necessary. It adds that the need to treat these metals will be based on further analysis of groundwater data against trigger levels that will occur in the ROD. Of these metals, chromium is believed to be the only metal to require treatment by the regulatory agencies, based on current and historic analytical data.</p> <p>(3)</p> <p>(3)</p> <p>(1)</p> <p>(3)</p> <p>(1)</p>

Notes
<p>Long-Term Monitoring is required in addition to the process monitoring for the groundwater remedial actions.</p> <p>event = field sampling event; water level monitoring and collection and analysis of groundwater samples from monitoring wells. Includes 4 quarterly and 6 semi-annual monitoring events</p>
<p>event = field event; water level monitoring and collection and analysis of groundwater samples from monitoring wells. Includes 4 quarterly and 25 annual monitoring events</p>
<p>event = field sampling event. Includes 8 quarterly, 6 semi-annual, and 25 annual monitoring events</p> <p>event = field sampling event. Includes 8 quarterly, 6 semi-annual, and 25 annual monitoring events</p> <p>event = field sampling event. Includes 8 quarterly, 6 semi-annual, and 25 annual monitoring events</p>

Notes
One report for each field sampling event. Includes 8 quarterly, 6 semi-annual, and 25 annual reports.
<p>TMSRA indicates only one well to be installed</p> <p>Number indicated in TMSRA Number needs to be confirmed by field visit and is dependent on total number of existing wells.</p> <p>Assume that one field event will be performed each of the 30 years to redevelop the wells.</p>
<p>(1) City/Lennar to provide Parcel B status information only to the Navy for 2013 five-year review. Completion of subsequent five-year reviews by the City/Lennar are included in this SOW.</p>
<p>Work Scheduled to begin May 2009 and may result in additional investigation being necessary.</p> <p>Assume that the three wells proposed in these areas have been installed.</p> <p>In-place volume</p>

Notes
In-place volume
The revetment design presented in the TMSRA and then the ROD is only schematic. This information is based on actual design work using AutoCad. It will need to be re-designed using new topographic and hydrographic information.
The duration for implementing ICs is expected to be in perpetuity.
(4)
(1); The RACR has been budgeted as one report. However consideration has been given to the remedial components being completed at different times, which will necessitate submission of up to 6 possible addenda to the RACR for the six major remedial components (SVE, groundwater remediation, soil excavation, capping, revetment construction and groundwater monitoring)
4 fact sheets per yr for yrs 1-5 (20 fact sheets); 1 fact sheet per yr for yrs 6-30 (25 fact sheets) It is assumed that Fact Sheet distribution will be performed by the City 12 mtgs per yr for yrs 1-5 and 4 mtgs per yr for yrs 6-30
Paid directly to agencies by City
Coverage duration is expected to be 10 years;

Notes

Notes

Note from Jake: Lisa, assume the following to come up w/ sq. ft.:

(1) Areas of new building over IR10A Plume = Liquid boot & Active Venting System

(2) Area requiring Liquid Boot and Passive Venting System = 50% of new building footprint areas (less No. 1 are:

a above)

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WBS Task / Subtask	Description	Scoping Item	Unit	Quantity	Notes
1.0	Project, Planning and Scheduling:				
1.1	Scheduling and Progress Reporting: Developing and maintaining a master project schedule and monthly progress reports.	Schedule updates Reports	ea ea	160 160	Monthly for the 1st 5 yrs; quarterly thereafter. Monthly for the 1st 5 yrs; quarterly thereafter.
1.2	Database Development and Maintenance: Development of a chemistry database to store all analytical data	SQL Database setup SQL Database maintenance	ea ea	1 1	Maintain SQL database for 30 yrs.
1.3	Administrative Record Support	Periodic Deliverable Requests	ea	1	Respond to periodic requests to provide additional copies of deliverables to the Navy and/or their contractors.
2.0	Soil Gas Survey				
	To be performed in the future parcel-wide and at discrete suspect areas for VOC soil gas analyses. Survey excludes any work outside Parcel G boundary. It is assumed that the Navy will have remedies in place to address any source of soil gas within 100 feet outside of Parcel G boundary prior to parcel transfer.				
2.1	Work Plan Preparation: Includes SAP, QAPP, & HSP	Work Plan	ea	1	(1)
2.2	Soil Gas Survey Implementation: Initial soil survey will provide a closely spaced grid at locations of IR-09, IR-33 and IR-71 VOC plumes. Elsewhere across Parcel G, the initial survey will be randomly located on a 100-foot grid spacing at areas that have not already been excavated and can not be negotiated to be clean with the regulatory agencies based on past-use / sampling experience. Two samples (near surface and near the groundwater table) will be taken at known or highly suspect locations. At other locations, only one sample depth will be performed. Where exceedances of screening criteria occur, a finer grid or select-location sampling will take place to define the extent during a 2nd mobilization.	Geoprobe Mob/Demob Sampling Survey Points Cores thru concrete floor slabs TO-15 analyses for volatiles (number of samples) Geotechnical samples	ea ea ea ea ea	2 378 80 472 43	15, 4, 20, and 12 survey points for IR-09, -33, -71E, -71W, respectively; 167 parcel wide based on 4.4 samples per acre (38 acres) 5, 1, 2, and 2 cores for IR-09, 33, 71W & 71E, respectively; 38 for parcel wide; Assumed 32 additional cores for 2nd round refinement. Total for initial round and follow-up refinement round; Quantity includes sampling at two depths at suspect areas and 10% duplicates. Geotech information pertinent for risk assessment such as soil type, porosity, moisture content, total organic content, and grain-size distribution; collected at 10% of soil gas sampling locations.
2.3	Soil Gas Survey Report: Includes data validation and reporting of soil gas survey results with figures and tables.	Report	ea	1	(1)
2.4	Development of Soil Gas Cleanup Levels Memorandum Assumes that the Navy will develop a risk methodology approach that is approved by the regulators and performed by Lennar/City/MACTEC. Memorandum will include what mitigation measures will be performed. It is assumed that both residential and industrial risk exposure scenarios will be utilized as evaluated in the ROD.	Memorandum	ea	1	(1)

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WBS Task / Subtask	Description	Scoping Item	Unit	Quantity	Notes
3.0	Remedial Design Includes remedial designs for the following components: <ul style="list-style-type: none"> •Hot spot soil excavations (if confirmed with the Navy that these areas have not already been removed with utility removals) •Soil cover •Long-term Groundwater Monitoring •Engineering controls including liquid-boot with vapor control •The need for remedial design for (continued) groundwater remediation using ZVI is pending clarification from the Navy regarding their intent and level of aggressiveness to complete their treatability test to meet ROD remedial goals before parcel transfer. At a minimum, a remedial design will be required in compliance with the ROD that specifies the need for process and/or long-term groundwater monitoring depending upon the final results of the treatability study. It is anticipated that the Navy will be completing the draft treatability study report by April 10, 2009 based on BCT presentation material.				It is assumed that the following components have been or will be completed by the Navy upon parcel transfer: <ul style="list-style-type: none"> •Removal of the Pickling and Plating Sump and associated soils as determined by confirmation sampling performed by the Navy. •Removal of all soil stockpiles (approximately 325 cy) as referenced in the ROD. •Completion of all radiological sampling and remediation. MACTEC has received BCT handout materials pertaining to the ZVI testing from the 1-21-09 BCT meeting that depicts injection locations completed to date and proposed injection and groundwater / soil vapor monitoring locations. Injections have been performed in IR-71 and IR-09. Two more injections are proposed at unspecified locations. No injections to our knowledge have been made yet in IR-33 and IR-71 eastern plume. It is also currently premature for treatability testing results to be available. It is not know if the Navy is anticipating that they will complete the remediation of IR-09, IR-33 and IR-71 upon parcel transfer. These intentions as well as detailed treatability test results will be needed to assess what Lennar's responsibilities will be upon parcel transfer.
3.1	Pre-Design Field Work Soil Cover Design Long-Term Groundwater Monitoring Work	<u>Pre-Design Field Activity</u> -Topographic survey -Monitoring well verification field reconnaissance	ea ea	1 1	
3.2	Remedial Design Documents Includes design for all the remedial elements including engineering controls such as liquid-boot with vapor controls. Institutional Controls (ICs)	Remedial Design (includes basis of design, specifications, and drawings.) LUCs CRUPs Deed Restrictions RMPs	ea ea ea ea	1 1 1 1	Includes Pre-Development and Active Redevelopment RMPs
4.0	Remedial Action Work Plan (RAWP) RAWP includes plans for the following components: <ul style="list-style-type: none"> •Hot spot soil excavations (if confirmed with the Navy that these areas have not already been removed with utility removals) •Soil cover •Long-term groundwater monitoring plan •Engineering controls including liquid-boot with vapor controls •The need for remedial design for (continued) groundwater remediation using ZVI is pending clarification from the Navy regarding their intent and level of aggressiveness to complete their treatability test to meet ROD remedial goals before parcel transfer. At a minimum, a remedial action work plan will be required that documents Parcel G groundwater conditions upon parcel transfer and the need for process and/or long-term groundwater monitoring depending upon the final results of the treatability study. 	RAWP (includes SAP, QAPP and HSP)	ea	1	(1)

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WBS Task / Subtask	Description	Scoping Item	Unit	Quantity	Notes
5.0	Remedial Implementation				
5.1	Soil Excavation & Monitoring: Entails removal of Hot Spot Areas AT-22 (Bldg 429) and AV-20 (Bldg 304), if not already removed. These areas have exceedances of lead and benzo[a]pyrene, respectively. •Site Preparation Activities •Survey Control •Hot Spot Excavation 2 areas AT-22 and AV-20 with total of 168 cy in volume per the ROD	Mob/Demob Permit applications Survey Excavation	ea ea cy	1 1 168	In-place volume specified in the ROD; Assumes not verification sampling is needed.
5.2	Groundwater Remediation: In-Situ Injection with ZVI Scope of work will be dependent upon Navy's intent and level of aggressiveness to complete their treatability test to meet ROD remedial goals before parcel transfer. Additional process monitoring may be required to assess the ZVI remediation.	TBD	TBD	TBD	
5.3	Soil Cover Construction •Site Preparation Activities •Survey Control •Cover Construction	Mob/Demob Survey Cover area	ea ea sq. ft.	1 1 1.27M	The cover will consist of either 2 feet of soil or hard-scape repairs based on a proposed walk-through of the site to assess current conditions
5.4	Vapor Control Application	Area Needing Liquid Boot and Passive Venting System	sq ft	178,695	Areas are for buildings that are entirely or in part over a VOC plume and include portions that cross over the Parcel G boundary. Areas exclude any risk assessment 100-foot buffer from the groundwater plume. Includes 10% contingencies for building foundations and utilities.
5.5	Long-Term Groundwater Monitoring •Field Work and Laboratory Analysis a) Years 1-2 Quarterly Sampling in years 1-2 collect and analyze groundwater samples from 66 wells and collect water levels from 32 additional wells. Assumes that current gw monitoring program will continue (18 wells) with the addition of samples collected under the SAP supplemental program (8 wells), 4 wells sampled to monitor for offsite migration of groundwater, and 36 wells installed a part of the pilot treatability program. Sampling frequency of quarterly for Years 1 through 2 is as specified in Table 6 of the ROD.	Water level monitoring and sampling and analysis of groundwater samples from monitoring wells	events	8	Long-Term Monitoring is required in addition to any process monitoring for the groundwater remedial action and only includes monitoring for COCs. event = field sampling event; water level monitoring and collection and analysis of groundwater samples from monitoring wells. Includes 8 quarterly monitoring events. Monitoring will include wells outside the Parcel G boundary and it is assumed that the Navy will provide access.

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WBS Task / Subtask	Description	Scoping Item	Unit	Quantity	Notes
	b) Years 3-15 Semi-Annual Sampling Collect and analyze groundwater samples from 58 wells in Years 3-5, from 46 wells in Years 6 through 15, and collect water levels from 23 additional wells in years 3-15. Assumes that by Year 3, 11 wells currently sampled that are within the stadium footprint will be abandoned, and that an estimated 6 new wells will be installed and incorporated into the sampling program as part of the remedy monitoring. Beginning in Year 6, wells that are monitored for metals only (11 wells) will be dropped from the analytical program (per the November 2008 Draft Final ROD) and the program will consist of groundwater samples for VOCs on a semiannual basis (46 wells) and groundwater chemistry parameters on an annual basis.	Water level monitoring and sampling and analysis of groundwater samples from monitoring wells	events	26	event = field sampling event; water level monitoring and collection and analysis of groundwater samples from monitoring wells. Includes 26 semi-annual monitoring events. Monitoring will include wells outside the Parcel G boundary and it is assumed that the Navy will provide access.
	c) Years 16 through 30 Annual Sampling Assumes that the groundwater treatment program is effective and that the monitoring program can be reduced to collecting samples from 37 wells. Assumes that the sampling program will consist of collecting groundwater samples for VOCs and groundwater chemistry parameters on an annual basis.	Water level monitoring and sampling and analysis of groundwater samples from monitoring wells	events	15	Revised from the semi-annual monitoring schedule specified in the November 26, 2008 Draft Final ROD. The current version of the ROD does not specify sampling frequency; event = field sampling event; water level monitoring and collection and analysis of groundwater samples from monitoring wells. Includes 15 annual monitoring events.
	•Reporting a) Data Validation For each sampling event, validate chemical analytical data and generate a Quality Control Summary Report. Level III validation will be performed on 80% of the samples and Level IV validation will be performed on 20% of the samples	Validate chemical analytical data and generate data validation summary report.	events	49	event = field sampling event. Includes 8 quarterly, 26 semi-annual, and 15 annual monitoring events.
	b) Data Management For each sampling event, the water level and chemical analytical data and data validation qualifiers will be loaded into a SQL database	Load data from groundwater monitoring program	events	49	event = field sampling event. Includes 8 quarterly, 26 semi-annual, and 15 annual monitoring events.
	c) Data Evaluation For each sampling event, the groundwater elevation and chemical analytical data will be compiled in tables and figures, evaluated and interpreted for presentation in applicable quarterly, semi-annual, and annual reports	Compile and evaluate data from groundwater monitoring program	events	49	event = field sampling event. Includes 8 quarterly, 26 semi-annual, and 15 annual monitoring events.
	d) Report Preparation Prepare a report presenting and interpreting data collected for each quarterly, semi-annual, or annual event. Draft, Draft Final, and Final versions of each report will be generated.	Prepare groundwater monitoring report	report	49	One report will be generated for each quarterly event in Years 1-2 and one report for each semi-annual or annual event in Years 3-30.
5.6	•Monitoring Well Installation/Well Abandonment It is assumed that 6 new wells will be installed to monitor the effectiveness of the groundwater remedy. a) Well Installation, Development, and Rehabilitation	Permitting and borehole clearance Install, develop, and survey wells Redevelop wells as needed	wells wells events	6 6 30	 assume that one field event will be performed each year to redevelop wells that have filled with sediment or other material.

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WBS Task / Subtask	Description	Scoping Item	Unit	Quantity	Notes
	b) Well Abandonment 104 wells abandoned in two separate events. The first event will include abandonment of 23 wells. The second event will include abandonment of 81 wells at the end of the groundwater monitoring program. c) Well Extension The potential requirement for well extensions will be assessed based upon the area of 2 foot cover	Abandon wells Add extensions to top of wells in areas determined as requiring soil cover	well well	104 TBD	
5.7	5-Year Reviews (2013 to 2043) •Preparation of Draft Five-Year Reviews •Response to Comments of Five-Year Reviews •Finalization of Five-Year Reviews	Reports	ea	7	(1); City/Lennar to provide Parcel G status information only to the Navy for 2013 five-year review. Completion of subsequent five-year reviews to be completed by the City/Lennar are included in this SOW.
5.8	Implementation of Institutional Controls	Enforce Deed Restrictions Annual Inspections Risk Management Oversight	ea ea ea	1 1 1	
6.0	Final Remedial Action Completion Report (RACR) •Final Remedial Action and Site Closure documentation	Report	ea	1	(1); The RACR has been budgeted as one report. However consideration has been given to the remedial components being completed at different times, which will necessitate submission of up to 3 to 4 possible addenda to the RACR for the major remedial components (groundwater remediation, soil excavation, capping, groundwater monitoring).
7.0	Public Involvement				
	•Updates to the Community Coordination Plan •Fact Sheets, and attendance of Citizen Advisory •Committee (CAC) meetings	Community Coordination Plan Updates Fact Sheets CAC Meetings	ea ea ea	1 45 160	Updates to plan developed under Parcel B SOW 4 fact sheets per yr for yrs 1-5 (20 fact sheets); 1 fact sheet per yr for yrs 6-30 (25 fact sheets) It is assumed that Fact Sheet distribution will be performed by the City 12 mtgs per yr for yrs 1-5 and 4 mtgs per yr for yrs 6-30
8.0	Regulatory Oversight				
		Estimated cost to be provided by the regulatory agencies.	TBD	TBD	Paid directly to agencies by City
9.0	Insurance				
		Includes Cost Cap & PLL Insurance	TBD	TBD	Coverage duration is expected to be 10 years; Additional groundwater remediation contingencies may be needed such as Lactate or Organo-Sulfur injections.
10.1	City/Lennar Administrative Support				
		3rd Party overseer for SFDPH/SFRA during the implementation of ETCA	TBD	TBD	

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2/3/2009**

WBS Task / Subtask	Description	Scoping Item	Unit	Quantity	Notes
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Notes:

(1) Deliverable involves preparation of an internal draft, draft, draft final and final submission.

(2) Closure of TPH sites within Parcel G are pending except site 37-A which is comingled with CERCLA. The long term monitoring at site 37-A is included.

BCT = BRAC Cleanup Team

BRAC = Base Realignment and Closure

CAC = Citizen Advisory Committee

COCs = Chemicals of Concern

CRUP = Covenant to Restrict Use of Property

cy = Cubic Yards

DVE = Dual-Phase Vacuum Extraction

ea = Each

GAC = Granular Activated Carbon

gw = groundwater

HSP = Health & Safety Plan

IC = Institutional Controls

LUCs = Land Use Controls

QAPP = Quality Assurance Project Plan

RA = Remedial Action

RACR = Remedial Action Completion Report

RAWP = Remedial Action Work Plan

RMP = Risk Management Procedures

ROD = Record of Decision

SAP = Sampling & Analysis Plan

SQL = Structured Query Language

SVE = Soil Vapor Extraction

TBD = To be determined

TPH = Total Petroleum Hydrocarbons

VM = Vapor Monitoring

VOC = Volatile Organic Compound

WBS = Work Breakdown Structure

ZVI = Zero Valent Iron

To be conducted parcel-wide over a 150 ft x 150 ft wide grid at areas that can not be negotiated to be clean with the regulatory agencies based on past-use / sampling experience. Also to be performed at suspect areas where former VOC soil or soil gas sampling has shown exceedances of ESLs. Where exceedances occur, a finer grid or select-location sampling will take place to define the extent during a 2nd mobilization.

Draft Document – 02/03/2009
Former Hunters Point Shipyard
Parcel B Guaranteed Fixed Price Remediation (GFPR)
Scoping Document Prepared by MACTEC

Parcel B Groundwater Remediation Strategy for VOCS -Concerns about details for using sodium lactate and polylactate, a slow or accelerated remedy, and the process possibly stalling at vinyl chloride.

There are inconsistencies in the approach presented in Parcel B ROD for bio-remediation of Building 123, IR-10A VOC Plume, and therefore an alternate lactate injection approach is proposed as described below;

TMSRA GW3-A description indicates use of glycerol polylactate

The proposed alternative GW-3A is described and costed in the Parcel B TMSRA (which serves to present alternatives for soil, groundwater and radiation issues) as:

p. 5-12, Section 5.3.3. “The biodegradation substrate (Alternative GW-3A) is a glycerol polylactate, which creates reducing conditions in the aquifer by forming lactic acid and hydrogen. The microbes use the lactic acid and hydrogen to degrade or mineralize the VOCs to their basic components by a process called reductive dechlorination. The biodegradation treatment is a timed-release compound that will continue to react for up to several years, depending on the dose of the treatment. The timed-release reaction is beneficial in low-permeability aquifers such as the A-aquifer at Parcel B because the slow release allows for more time for dispersion of the substrate and more time for the substrate to come in contact with the COCs and cause them to be immobilized or mineralized.”; and

p. 6-25, Section 6.3.3. “The treatment alternative for GW-3A is a bioremediation substrate that enhances anaerobic bioremediation by releasing hydrogen. ... The advantage of the slower-reacting bioremediation substrate is the continued reaction as the substrate disperses, potentially creating a wider treatment area, and the continued treatment for “rebound” conditions.”

TMSRA – Appendix D – the cost section implies a different approach, i.e., sodium lactate

Cost assumptions and cost estimates in Appendix D of the TMSRA appear to use a different injection material, sodium lactate, which has a shorter persistence in the aquifer. Page D-18 says:

“4. Approximately 3,300 pounds of sodium lactate is needed for the treatment volume of 32,000 cubic feet *[ed., based on a 4,000 square foot application area, an aquifer thickness of 20 feet, and a porosity of 0.4]*, according to the lactate vendor. Sodium lactate is delivered in 600-pound drums; therefore, 3,600 pounds of sodium lactate would be purchased for the project.”

The GW-3A alternative bioremediation cost presented on Table D-8A in the TMSRA is based on sodium lactate as on page D-18, and totals \$15,621 (capital cost).

Similar contradictions are carried through in the ROD

Wording in the Parcel B ROD (November 7, 2008) also support use of the slow-release compound (p. 9-9 and p.12-14). The text on page 9-10 states that the capital cost for the biological substrate is \$75,000, but

the cost summary table for Alternative GW-3A (Table 12-2A) states a cost of \$15,620, which is the cost estimate for use of sodium lactate in the TMSRA.

In addition to the apparent discrepancy between the proposed use of a slow-release, persistent compound (up to three years) versus the short-term persistence of sodium lactate (probably six months or less), there are questions concerning the ability of the sodium lactate injection at the proposed dose and single injection to provide complete degradation as opposed to the reactions stalling at vinyl chloride.

MACTEC's new proposal

It is MACTEC's belief that use of the single injection of sodium lactate focused only on an estimated 4,000 sq. ft application area will not achieve remedial objectives without also relying substantially on monitored natural attenuation (MNA) over an indefinite period of time, if the remedial goals are ever actually achieved at all. Unless the regulatory agencies concur in writing that MNA (which is not a stated component of the selected remedy) is acceptable given the recalcitrant nature of vinyl chloride (VC), then MACTEC proposes that a more aggressive injection scenario be used. For consistency MACTEC's approach is based on contact with the same vendor that the Navy consulted for their cost estimate, JRW Technologies. This vendor indicated that up to 4 injections of sodium lactate at 6-month intervals would be required to achieve remedial objectives. Furthermore, they recommended injecting initially over the entire plume area (approximately 18,000 sq. ft as depicted in the ROD) at a 25 by 30-foot spacing which results in approximately 40 injection points. This injection area can likely be decreased in subsequent rounds based on the success of evenly distributing the lactate within the aquifer and effectiveness of the biodegradation. MACTEC believes that the initial spacing may be overly optimistic given the low-permeable soil conditions as observed from the Navy's In-Situ Sequential Anaerobic-Aerobic Bioremediation Treatability Study performed at the Building 134 property. However, the multiple rounds of injections should provide opportunity to inject at off-set locations between previous injection points to ultimately obtain complete coverage if distribution within the saturated zone becomes an issue.

If the intent by the Navy was to use a true slow release glycerol polylactate, such as discussed in the text of the ROD, HRC®, manufactured by Regenesis, would be an appropriate reagent. However, Regenesis recommended injection over the entire plume area (and not a 4,000 sq. ft. area as proposed in the ROD) on a 10 ft by 10 ft spacing with a single injection event to ensure remedial objectives were achieved. This would result in approximately 180 injection points. Regenesis was concerned about providing adequate reagent distribution with greater spacing and only one injection event.